

What is claimed is:

1 1. A broadcasting apparatus that broadcasts a specific
2 program to which a reproduction time period between a starting
3 time and a finishing time is specified, the reproduction being
4 performed by a receiving apparatus, the broadcasting apparatus
5 comprising:

6 allotment means for allotting a broadcasting bandwidth
7 for the reproduction time period to the specific program and
8 allotting a part of the broadcasting bandwidth for a preceding
9 time period immediately before the reproduction time period to
10 the specific program and the other part of the broadcasting
11 bandwidth to other program; and

12 transmission means, in accordance with the result of
13 allotment by the allotment means, for (a) repeatedly
14 transmitting program data of the other program while
15 transmitting program data of the specific program in the
16 preceding time period, and (b) repeatedly transmitting the
17 program data of the specific program in the reproduction time
18 period.

1 2. The broadcasting apparatus of Claim 1,

2 wherein the allotment means sets a starting time of the
3 preceding time period as a first time and a time included in
4 between the first time and the starting time of the reproduction
5 time period as a second time, and

6 the allotment means (a) allots a broadcasting bandwidth
7 not broader than a predetermined broadcasting bandwidth to the

8 specific program from the first time to the second time, and
9 (b)allots a broadcasting bandwidth broader than the
10 predetermined broadcasting to the specific program from the
11 second time to the finishing time of the reproduction time
12 period.

1 3. The broadcasting apparatus of Claim 2,
2 wherein the transmission means transmits the program data
3 having a second ID of the specific program for the preceding
4 time period, and repeatedly transmits control data as well as
5 the program data for the reproduction time period, and
6 the control data has a first ID and includes instructions
7 for the receiving apparatus, when the receiving apparatus
8 receives the program data having the second ID, to cache and
9 reproduce the program data,
10 wherein a program data having the first ID must be taken
11 in by the receiving apparatus, and the second ID is different
12 from the first ID.

1 4. The broadcasting apparatus of Claim 2,
2 wherein the program data for the specific program is
3 classified into (a) a first type program data and (b) a second
4 type program data which is different from the first type program
5 data at least in part, and
6 the transmission means transmits the first type program
7 data for a duration from the first time to the starting time
8 of the reproduction time period, and transmits the second type

9 program data for a duration from the second time to the finishing
10 time of the reproduction time period.

1 5. The broadcasting apparatus of Claim 2, further
2 comprising:

3 means for transmitting a cache instruction message before
4 the starting time of the reproduction time period of the
5 specific program,

6 wherein the cache instruction message instructs the
7 receiving apparatus to cache the received program data of the
8 specific program.

1 6. The broadcasting apparatus of Claim 2,

2 wherein the program data of the other programs which is
3 repeatedly transmitted by the transmission means in the
4 preceding time period includes an instruction for the receiving
5 apparatus, when the receiving apparatus receives the program
6 data of the specific program, to cache the program data.

1 7. The broadcasting apparatus of Claim 2, further
2 comprising:

3 means for repeatedly transmitting a cache instruction
4 message at a time interval that is not longer than a transmission
5 period of the program data of the specific program before the
6 starting time of the reproduction time period of the specific
7 program,

8 wherein the cache instruction message instructs the

9 receiving apparatus to cache the received program data of the
10 specific program.

1 8. The broadcasting apparatus of Claim 2, further
2 comprising:

3 means for transmitting a reproduction instruction
4 message at the starting time of the reproduction time period
5 of the specific program,

6 wherein the reproduction instruction message instructs
7 the receiving apparatus to reproduce the recorded program data
8 of the specific program immediately after receiving the
9 message.

1 9. The broadcasting apparatus of Claim 2, further
2 comprising:

3 means for transmitting a reproduction instruction
4 message before the starting time of the reproduction time period
5 of the specific program,

6 wherein the reproduction instruction message instructs
7 the receiving apparatus to reproduce the recorded program data
8 of the specific program at the starting time of reproduction
9 time period of the specific program.

1 10. The broadcasting apparatus of Claim 2, further
2 comprising:

3 means for transmitting a deletion instruction message at
4 the finishing time of the reproduction time period of the

10 predetermined broadcasting bandwidth to the program data of the
11 first specific program for a time period other than the first
12 time period in the total time period, and

13 (d)a broadcasting bandwidth narrower than the
14 predetermined broadcasting bandwidth to the program data of the
15 second specific program for a time period other than the second
16 time period in the total time period.

1 19. The broadcasting apparatus of Claim 17,

2 wherein the allotment means allots

3 (a)a broadcasting bandwidth not narrower than a
4 predetermined broadcasting bandwidth to the program data of the
5 first specific program for the first time period and a time
6 period immediately before the first time period,

7 (b)a broadcasting bandwidth not narrower than the
8 predetermined broadcasting bandwidth to the program data of the
9 second specific program for the second time period and a time
10 period immediately before the second time period,

11 (c)a broadcasting bandwidth narrower than the
12 predetermined broadcasting bandwidth to the program data of the
13 first specific program for a time period other than the first
14 time period and the time period immediately before the first
15 time period in the total time period, and

16 (d)a broadcasting bandwidth narrower than the
17 predetermined broadcasting bandwidth to the program data of the
18 second specific program for a time period other than the second
19 time period and the time period immediately before the second

20 time period in the total time period.

1 20. A broadcasting apparatus that transmits a data
2 broadcasting program and a first and a second specific programs
3 which are interposed in the data broadcasting program, the
4 broadcasting apparatus comprising:

5 allotment means for

6 (a) allotting a broadcasting bandwidth for a first time
7 period and a second time period to the first specific program
8 and the second specific program, the first time period and the
9 second time period are included in a total time period between
10 a starting time and a finishing time for broadcasting the data
11 broadcasting program, and

12 (b) allotting (1) a broadcasting bandwidth to the data
13 broadcasting data program in the total time period except for
14 the first time period and the second time period, (2) a part
15 of the broadcasting bandwidth to the first specific program for
16 a time period preceding to the first time period in the total
17 time period, and (3) a part of the broadcasting bandwidth to
18 the second specific program for a time period preceding to the
19 second time period in the total time period;

20 instruction generation means for generating a first
21 storage instruction and a second storage instruction that
22 instruct a receiving apparatus to store a program data for the
23 first specific program and a program data for the second
24 specific program in a storing unit in the receiving apparatus,
25 respectively, and generating a first reproduction instruction

10 predetermined broadcasting bandwidth to the program data of the
11 first specific program for a time period preceding to the first
12 time period in the total time period, and

13 (d) a broadcasting bandwidth narrower than the
14 predetermined broadcasting bandwidth to the program data of the
15 second specific program for a time period preceding to the
16 second time period in the total time period.

1 22. The broadcasting apparatus of Claim 20,

2 wherein the allotment means allots

3 (a) a broadcasting bandwidth not narrower than a
4 predetermined broadcasting bandwidth to the program data of the
5 first specific program for the first time period and a time
6 period immediately before the first time period,

7 (b) a broadcasting bandwidth not narrower than the
8 predetermined broadcasting bandwidth to the program data of the
9 second specific program for the second time period and a time
10 period immediately before the second time period,

11 (c) a broadcasting bandwidth narrower than the
12 predetermined broadcasting bandwidth to the program data of the
13 first specific program for a time period preceding to the first
14 time period and the immediately preceding period to the first
15 time period in the total time period, and

(d) a broadcasting bandwidth narrower than the
predetermined broadcasting bandwidth to the program data of the
second specific program for a time period preceding to the
second time period and the immediately preceding period to the

second time period in the total time.

23. A broadcasting apparatus that transmits a program block which is composed of a data broadcasting program and a program or two or more successive programs which are interposed in the data broadcasting program, wherein a reproduction time period between a starting time and a finishing time is specified to each of the data broadcasting program and programs included in the program block and the reproduction is performed by a receiving apparatus, the broadcasting apparatus comprising:

allotment means for

(a) allotting a broadcasting bandwidth from a first time to the starting time of the reproduction time period of the leading program included in the specific program block to the data broadcasting program and all of the programs included in the specific program block, and

(b) allotting the broadcasting bandwidth for a reproduction time period of each program included in the specific program block to the program and the following programs included in the same program block,

wherein the first time is a time in the reproduction time period of the data broadcasting program and which satisfies a condition so as not to interpose the other program blocks between the first time and the specific program block;

instruction generation means for generating a storage instruction that instructs the receiving apparatus to store a program data of each program included in the specific program

26 block in a storing unit in the receiving apparatus, and
27 generating a reproduction instruction that instructs the
28 receiving apparatus to reproduce the program data, in case that
29 the program data of each program has been stored in the storing
30 unit;

31 transmission means for repeatedly transmitting the
32 program data of the data broadcasting program and each program
33 included in the specific program block in accordance with the
34 result of allotment by the allotment means; and

35 control means for controlling the transmission means so
36 as to transmit a plurality of the storage instructions for each
37 program included in the specific program block before the
38 starting time of the reproduction time period of the program,
39 and transmit the reproduction instruction for the program at
40 the starting time of the reproduction time period of the
41 program.

1 24. The broadcasting apparatus of Claim 23,
2 wherein the allotment means allots (a) a broadcasting
3 bandwidth not narrower than a predetermined broadcasting
4 bandwidth to each program included in the specific program block
5 for a reproduction time period of each program, and (b) a
6 broadcasting bandwidth narrower than the predetermined
7 broadcasting bandwidth to each program for a time period other
8 than the reproduction time period.

1 25. The broadcasting apparatus of Claim 23,

18 not broader than a predetermined broadcasting bandwidth to the
19 first and the second programs for the first transmission time
20 period,

21 (b) a broadcasting bandwidth broader than the
22 predetermined broadcasting bandwidth to the first program and
23 a broadcasting bandwidth not broader than the predetermined
24 broadcasting bandwidth to the second program for the second
25 transmission period, and

26 (c) a broadcasting bandwidth broader than the
27 predetermined broadcasting bandwidth to the second program for
28 the third transmission time period.

1 27. The broadcasting apparatus of Claim 23,

2 wherein in case that a first program and a second program
3 which follows the first program are included in the program
4 block,

5 the allotment means determines a broadcasting bandwidth
6 which is allocated to the first program and the second program
7 for a first through a fourth transmission time periods in the
8 following manner:

9 wherein the first through the fourth transmission time
10 periods are time periods which are divided by the first time,
11 a second time, a third time, the starting time of the
12 reproduction time period of the second program, and the
13 finishing time of the reproduction time period of the second
14 program in the stated order,

15 wherein the second time is a time in the reproduction time

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16 period of the data broadcasting program, and the third time is
17 a time in the reproduction time period of the first program,
18 the allotment means allots

19 (a) a broadcasting bandwidth not broader than a
20 predetermined broadcasting bandwidth to the first and the
21 second programs for the first transmission time period,

22 (b) a broadcasting bandwidth broader than the
23 predetermined broadcasting bandwidth to the first program and
24 a broadcasting bandwidth not broader than the predetermined
25 broadcasting bandwidth to the second program for the second
26 transmission period,

27 (c) a broadcasting bandwidth broader than the
28 predetermined broadcasting bandwidth to the first program and
29 a broadcasting bandwidth broader than the predetermined
30 broadcasting bandwidth to the second program for the third
31 transmission time period, and

32 (d) a broadcasting bandwidth broader than the
33 predetermined broadcasting bandwidth to the second program for
34 the fourth transmission time period.

1 28. A broadcasting method for broadcasting a specific program
2 to which a reproduction time period between a starting time and
3 a finishing time is specified, the reproduction being performed
4 by a receiving apparatus, the broadcasting method comprising
5 the steps of:

6 an allotment step for allotting a broadcasting bandwidth
7 for the reproduction time period to the specific program and

8 allotting a part of the broadcasting bandwidth for a preceding
9 time period immediately before the reproduction time period to
10 the specific program and the other part of the broadcasting
11 bandwidth to other program; and

12 a transmission step, in accordance with the result of
13 allotment in the allotment step, for (a) repeatedly transmitting
14 program data of the other program while transmitting program
15 data of the specific program in the preceding time period, and
16 (b) repeatedly transmitting the program data of the specific
17 program in the reproduction time period.

1 29. A broadcasting method for transmitting a data
2 broadcasting program and a first specific program and a second
3 specific program which are interposed in the data broadcasting
4 program, the broadcasting method comprising the steps of:

5 an allotment step for

6 (a) allotting a broadcasting bandwidth for a first time
7 period and a second time period to the first specific program
8 and the second specific program, the first time period and the
9 second time period are included in a total time period between
10 a starting time and a finishing time for broadcasting the data
11 broadcasting program, and

12 (b) allotting a part of the broadcasting bandwidth to the
13 first and the second specific programs and the other part of
14 the broadcasting bandwidth to the data broadcasting program for
15 all of time periods other than the first and the second time
16 periods in the total time period;

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17 an instruction generation step for generating a first
18 storage instruction and a second storage instruction that
19 instruct the receiving apparatus to store a program data for
20 the first specific program and a program data for the second
21 specific program in a storing unit in the receiving apparatus,
22 respectively, and generating a first reproduction instruction
23 and a second reproduction instruction that instruct a receiving
24 apparatus to reproduce the program data for the first specific
25 program and the program data for the second specific program,
26 respectively, in case that the program data for the first
27 specific program and the program data for the second specific
28 program have been stored in the storing unit; and

29 a transmission step for transmitting (a) a plurality of
30 the first storage instructions before the first time period,
31 (b) the first reproduction instruction at the starting time of
32 the first time period, (c) a plurality of the second storage
33 instructions before the second time period, and (d) the second
34 reproduction instruction at the starting time of the second time
35 period, while repeatedly transmitting the program data of each
36 of the data broadcasting program, the first specific program,
37 and the second specific program in accordance with the result
38 of allotment in the allotment step.

1 30. A broadcasting method for transmitting a data
2 broadcasting program and a first specific program and a second
3 specific program which are interposed in the data broadcasting
4 program, the broadcasting method comprising the steps of:

32 a transmission step for transmitting (a) a plurality of
33 the first storage instructions before the first time period,
34 (b) a plurality of the second storage instructions before the
35 second time period, (c) the first reproduction instruction at
36 the starting time of the first time period, and (d) the second
37 reproduction instruction at the starting time of the second time
38 period, while repeatedly transmitting the program data of each
39 of the data broadcasting program, the first specific program,
40 and the second specific program in accordance with the result
41 of allotment in the allotment step.

1 31. A broadcasting method for transmitting a program block
2 which is composed of a data broadcasting program and a program
3 or two or more successive programs which are interposed in the
4 data broadcasting program, wherein a reproduction time period
5 between a starting time and a finishing time is specified to
6 each of the data broadcasting program and programs included in
7 the program block, the broadcasting method comprising the steps
8 of:

9 an allotment step for

10 (a) allotting a broadcasting bandwidth from a first time
11 to the starting time of the reproduction time period of the
12 leading program included in the specific program block to the
13 data broadcasting program and all of the programs included in
14 the specific program block, and

15 (b) allotting the broadcasting bandwidth for a
16 reproduction time period of each program included in the

11 second time period are included in a total time period between
 12 a starting time and a finishing time for broadcasting the data
 13 broadcasting program, and

14 (b) allotting a part of the broadcasting bandwidth to the
 15 first and the second specific programs and the other part of
 16 the broadcasting bandwidth to the data broadcasting program for
 17 all of time periods other than the first and the second time
 18 periods in the total time period;

19 an instruction generation step for generating a first
 20 storage instruction and a second storage instruction that
 21 instruct the receiving apparatus to store a program data for
 22 the first specific program and a program data for the second
 23 specific program in a storing unit in the receiving apparatus,
 24 respectively, and generating a first reproduction instruction
 25 and a second reproduction instruction that instruct a receiving
 26 apparatus to reproduce the program data for the first specific
 27 program and the program data for the second specific program,
 28 respectively, in case that the program data for the first
 29 specific program and the program data for the second specific
 30 program have been stored in the storing unit; and

31 a transmission step for transmitting (a) a plurality of
 32 the first storage instructions before the first time period,
 33 (b) the first reproduction instruction at the starting time of
 34 the first time period, (c) a plurality of the second storage
 35 instructions before the second time period, and (d) the second
 36 reproduction instruction at the starting time of the second time
 37 period, while repeatedly transmitting the program data of each

38 of the data broadcasting program, the first specific program,
39 and the second specific program in accordance with the result
40 of allotment in the allotment step.

1 34. A program recording medium which is readable for a
2 computer in a broadcasting apparatus, the broadcasting
3 apparatus transmits a data broadcasting program and a first and
4 a second specific programs which are interposed in the data
5 broadcasting program, the computer program embodied on the
6 program recording medium has the computer conduct the steps of:

7 an allotment step for

8 (a) allotting a broadcasting bandwidth for a first time
9 period and a second time period to the first specific program
10 and the second specific program, the first time period and the
11 second time period are included in a total time period between
12 a starting time and a finishing time for broadcasting the data
13 broadcasting program, and

14 (b) allotting (1) a broadcasting bandwidth to the data
15 broadcasting data program in the total time period except for
16 the first time period and the second time period, (2) a part
17 of the broadcasting bandwidth to the first specific program for
18 a time period preceding to the first time period in the total
19 time period, and (3) a part of the broadcasting bandwidth to
20 the second specific program for a time period preceding to the
21 second time period in the total time period;

22 an instruction generation step for generating a first
23 storage instruction and a second storage instruction that

34 storage instructions for each program included in the specific
 35 program block before the starting time of the reproduction time
 36 period of the program, and transmitting the reproduction
 37 instruction for the program at the starting time of the
 38 reproduction time period of the program, while repeatedly
 39 transmitting the program data of the data broadcasting program
 40 and each program included in the specific program block in
 41 accordance with the result of allotment in the allotment step.

1 36. A program that is readable for a computer in a broadcasting
 2 apparatus, the broadcasting apparatus broadcasts a specific
 3 program to which a reproduction time period between a starting
 4 time and finishing time is specified, the reproduction being
 5 performed by a receiving apparatus, the program has the computer
 6 conduct the steps of:

7 an allotment step for allotting a broadcasting bandwidth
 8 for the reproduction time period to the specific program and
 9 allotting a part of the broadcasting bandwidth for a preceding
 10 time period immediately before the reproduction time period to
 11 the specific program and the other part of the broadcasting
 12 bandwidth to other program; and

13 a transmission step, in accordance with the result of allotment
 14 in the allotment step, for (a) repeatedly transmitting program
 15 data of the other program while transmitting program data of
 16 the specific program in the preceding time period, and (b)
 17 repeatedly transmitting the program data of the specific
 18 program in the reproduction time period.

27 respectively, in case that the program data for the first
28 specific program and the program data for the second specific
29 program have been stored in the storing unit; and

30 a transmission step for transmitting (a) a plurality of
31 the first storage instructions before the first time period,
32 (b) the first reproduction instruction at the starting time of
33 the first time period, (c) a plurality of the second storage
34 instructions before the second time period, and (d) the second
35 reproduction instruction at the starting time of the second time
36 period, while repeatedly transmitting the program data of each
37 of the data broadcasting program, the first specific program,
38 and the second specific program in accordance with the result
39 of allotment in the allotment step.

1 38. A program that is readable for a computer in a broadcasting
2 apparatus, the broadcasting apparatus transmits a data
3 broadcasting program and a first and a second specific programs
4 which are interposed in the data broadcasting program, the
5 program has the computer conduct the steps of:

6 an allotment step for

7 (a) allotting a broadcasting bandwidth for a first time
8 period and a second time period to the first specific program
9 and the second specific program, the first time period and the
10 second time period are included in a total time period between
11 a starting time and a finishing time for broadcasting the data
12 broadcasting program, and

13 (b) allotting (1) a broadcasting bandwidth to the data

14 broadcasting data program in the total time period except for
15 the first time period and the second time period, (2) a part
16 of the broadcasting bandwidth to the first specific program for
17 a time period preceding to the first time period in the total
18 time period, and (3) a part of the broadcasting bandwidth to
19 the second specific program for a time period preceding to the
20 second time period in the total time period;

21 an instruction generation step for generating a first
22 storage instruction and a second storage instruction that
23 instruct a receiving apparatus to store a program data for the
24 first specific program and a program data for the second
25 specific program in a storing unit in the receiving apparatus,
26 respectively, and generating a first reproduction instruction
27 and a second reproduction instruction that instruct the
28 receiving apparatus to reproduce the program data for the first
29 specific program and the program data for the second specific
30 program, respectively, in case that the program data for the
31 first specific program and the program data for the second
32 specific program have been stored in the storing unit; and

33 a transmission step for transmitting (a) a plurality of
34 the first storage instructions before the first time period,
35 (b) a plurality of the second storage instructions before the
36 second time period, (c) the first reproduction instruction at
37 the starting time of the first time period, and (d) the second
38 reproduction instruction at the starting time of the second time
39 period, while repeatedly transmitting the program data of each
40 of the data broadcasting program, the first specific program,

41 and the second specific program in accordance with the result
42 of allotment in the allotment step.

1 39. A program that is readable for a computer in a broadcasting
2 apparatus, the broadcasting apparatus transmits a program block
3 which is composed of a data broadcasting program and a program
4 or two or more successive programs which are interposed in the
5 data broadcasting program, wherein a reproduction time period
6 between a starting time and a finishing time is specified to
7 each of the data broadcasting program and programs included in
8 the program block, the program has the computer conduct the
9 steps of:

10 an allotment step for

11 (a) allotting a broadcasting bandwidth from a first time
12 to the starting time of the reproduction time period of the
13 leading program included in the specific program block to the
14 data broadcasting program and all of the programs included in
15 the specific program block, and

16 (b) allotting the broadcasting bandwidth for a
17 reproduction time period of each program included in the
18 specific program block to the program and the following programs
19 included in the same program block,

20 wherein the first time is a time in the reproduction time
21 period of the data broadcasting program and which satisfies a
22 condition so as not to interpose the other program blocks
23 between the first time and the specific program block;

24 an instruction generation step for generating a storage

25 instruction that instructs the receiving apparatus to store a
26 program data of each program included in the specific program
27 block in a storing unit in the receiving apparatus, and
28 generating a reproduction instruction that instructs the
29 receiving apparatus to reproduce the program data, in case that
30 the program data of each program has been stored in the storing
31 unit;

32 a transmission step for transmitting a plurality of the
33 storage instructions for each program included in the specific
34 program block before the starting time of the reproduction time
35 period of the program, and transmitting the reproduction
36 instruction for the program at the starting time of the
37 reproduction time period of the program, while repeatedly
38 transmitting the program data of the data broadcasting program
39 and each program included in the specific program block in
40 accordance with the result of allotment in the allotment step.